Chapter 3.3 WATER QUALITY ASSESSMENT SUMMARY

Statewide summaries of the river miles, estuarine square miles, and lake/reservoir acres within and/or bordering Virginia that fully support, partially support, or do not support the overall designated uses for each waterbody are presented in Tables 3.3-2 through 3.3-5. Support of the overall uses for each waterbody was determined by examining the support of the five uses. (i.e., aquatic life, fish consumption, shellfishing, swimming, and drinking water).

As in previous 305(b) reports, conventional pollutant data continued to make up the bulk of water quality assessments. Samples for conventional pollutants were collected at DEQ's monitoring stations, along with "quality assured" monitoring data from other federal, state and citizen monitoring programs, and compared to Virginia's Water Quality Standards. Unlike previous assessments, which used the binomial statistical method for conventional pollutant analysis, DEQ used the slightly modified absolute percentage procedure, recommended by EPA guidance, to determine the degree of use support. The assessment is objective except where professional judgement indicates that natural causes are responsible for the violations (or the data are suspect). Waters not meeting standards due to natural conditions are listed as impaired and will be reviewed to determine if it needs to be included in the TMDL development list. For dissolved oxygen (DO), the instantaneous minimum standard was used to assess exceedences. The degree of use support was determined as follows:

- Fully supporting - for any one of the conventional parameters, Virginia Water Quality Standard is exceeded in ≤ 10% of the measurements taken over the reporting period.
- Partially supporting - for any one of these parameters, Virginia Water Quality Standard is exceeded in 11% to 25% of the measurements taken over the reporting period with at least two exceedences.
- Not supporting - for any one of these parameters, Virginia Water Quality Standard is exceeded in >25% of the measurements taken over the reporting period with at least two exceedences.

Table 3.3-1 Virginia Water Quality Standards for Dissolved Oxygen, pH, and Maximum Temperature (9 VAC 25-260-50)

Class of Waters	Description	Dissolved Oxygen (mg/l)		pH(su)	Maximum Temperature (CE)
		Min.	Daily Avg.		
I	Open Ocean	5.0	--	6.0-9.0	--
II	Estuarine Waters	4.0	5.0	6.0-9.0	--
III	Non-Tidal Waters	4.0	5.0	6.0-9.0	32
IV	Mountainous Zone Waters	4.0	5.0	6.0-9.0	31
V	Put & Take Trout Waters	5.0	6.0	6.0-9.0	21
VI	Natural Trout Waters	6.0	7.0	6.0-9.0	20

Table 3.3-2 provides a summary of all waters assessed (monitored and evaluated). Assessment of Virginia's rivers and streams was calculated to be approximately 50,415 miles. For the 2002 assessment, DEQ has used the, much improved, Assessment Database (ADB) version 1.1.2 that EPA has provided the states. This version is based on a watershed segmentation format which allows evaluated miles to be assessed separately from monitored miles. For instance, fish consumption designated use is "evaluated" as fully supporting for all waters within the state unless there is a VDH advisory based on fish tissue monitoring and/or an exceedence of a fish tissue screening value, also based on fish tissue monitoring. Prior to the

2000 305(b) report, the federal database allowed only one designation of monitored or evaluated for the whole watershed. Therefore, where only part of a watershed was actually monitored, the whole watershed would, by default, be considered monitored because evaluated waters could not be segmented from monitored waters. Using the new and improved database, the actual monitored segments are now considered monitored and any other evaluated data within the watershed is considered evaluated, creating a monitored segment(s) as well as an evaluated segment(s) all within the same watershed. As a result of these refinements and the segmentation of evaluated and monitored waters, the total miles monitored appear to have been reduced from pre-2000 305(b) reports, while the evaluated miles have greatly increased.

Additionally, further geographical re-indexing and use of the National Hydrologic Database (NHD) has slightly increased the actual number of stream miles within the state from previous reports. The stream mile delineation guidance has provided consistent guidelines for associating the mileage assessed relative to a specific sampling station. This is especially important where there are no easily identifiable changes in watershed characteristics. In some cases, the stream miles associated with a sampling station have been conservatively reduced from previous assessment reports. The stream mile delineations found in this report are only reflective of the 2002 assessment period but follow closely with the monitoring efforts reported in the 2000 report.

Assessment of one or more designated uses of estuarine waters covered approximately 2,462 square miles of tidal estuaries. Coverage of coastal shore miles remained at 120 linear shore miles. An increased effort to assess the 104 most significant public lakes was accomplished. A total of 148,462 acres were assessed for one or more uses. Table 3.3-3 summarizes the assessments of Virginia's waters for support of aquatic life, fish consumption, shellfish consumption, swimming and public water supply uses. Table 3.3-4 lists the causes for waters resulting in less than full support of the Clean Water Act goals and state Water Quality Standards. All coastal shore waters were evaluated to be fully supporting the fishable and swimmable goals. Therefore, no causes of less than full support have been identified for these waters.

A “major impact” of causes and sources is defined as that which causes a significant impairment to the waterbody. Normally, a major impact would be from a sole source or a large contributor and would cause the waters to be not supporting. Moderate and minor impacts have a slight to moderate effect on the waters and may be from a single moderate contributor or a combination of several minor contributors and would generally cause the waters to be considered partially supporting.

As previously stated, the causes and sources of use impairment of Virginia's waters, resulting in less than full support of Clean Water Act goals, are summarized in Tables 3.3-4 and 3.3-5. It is apparent, urban runoff and agricultural nonpoint sources are primary contributors of use impairment and major impacts. It is also important to point out that natural sources have a major impact on water quality. Equally apparent, the primary pollutants causing use impairment are low dissolved oxygen from nutrient enrichment, pH problems associated with natural, low-flow, swamp waters and pathogen indicators.

TABLE 3.3 - 2 - SUMMARY of ASSESSED WATERS

Degree of Use Support	Type	Assessment Category		Total Assessed Size
		Evaluated	**Monitored**	
Size Fully Supporting All Assessed Uses	R	36,129.11	4,540.54	40,669.65
	L	11,516.63	9,334.84	20,851.47
	E	126.65	23.25	149.90
Size Fully Supporting All Assessed Uses but Threatened for at Least One Use	R	3,963.70	943.88	4,907.58
	L	9,144.77	2,907.83	12,052.60
	E	161.46	495.27	656.73
Size Impaired for One or More Uses	R	516.86	4,320.80	4,837.66
	L	182.00	115,375.71	115,557.71
	E	34.17	1,621.41	1,655.58
Total Assessed for One or More Uses	R	40,609.67	9,805.22	50,414.89
	L	20,843.40	127,618.40	148,461.80
	E	322.28	2,139.93	2,462.21

R = River – miles
L = Lake - acres
E = Estuary - square miles

TABLE 3.3 - 3 - WATERBODY INDIVIDUAL USE SUPPORT SUMMARY TABLE

Total Size Assessed:
Rivers – 50,414.89 miles
Lakes – 148,316.80 acres
Estuaries - 2,462.21 mi^2

Waterbody Size Assessed:
Rivers – 50,415 miles
Lakes - 148,317 acres
Estuaries - 2,462 mi^2

Use	WaterBody Type	Size Fully Supporting	Size Fully Supporting but Threatened	TOTAL SIZE SUPPORTING	Size Partially Supporting	Size Not Supporting	TOTAL SIZE IMPAIRED	Size Assessed (Monitored and Evaluated)
Aquatic Life	River	7,934.80	5,356.56	**13,291.36**	1,231.53	1,060.35	**2,291.88**	15,583.24
	Lake	59,222.97	12,353.48	**71,576.45**	2,169.95	60,908.88	**63,078.83**	134,655.30
	Estuary	141.98	724.19	**866.17**	1,166.98	400.42	**1,567.40**	2,434.00
Fish Consumption	River	48,525.02	1,305.60	**49,830.62**	450.53	133.74	**584.27**	50,414.89
	Lake	62,736.89	7,620.65	**70,357.54**	78,104.24	0.00	**78,104.24**	148,461.78
	Estuary	2,031.05	356.41	**2,387.46**	74.37	0.00	**74.37**	2,461.83
Shellfish Consumption	River	-	-	**-**	-	-	**-**	-
	Lake	-	-	**-**	-	-	**-**	-
	Estuary *	2,048.44	1.04	**2,049.48**	81.57	0.50	**82.07**	2,161.27
Swimming	River	5,825.87	10.15	**5,836.02**	1,928.46	1,242.32	**3,170.78**	9,006.80
	Lake	115,996.80	0.00	**115,996.80**	907.00	154.00	**1,061.00**	117,057.80
	Estuary	802.43	0.21	**802.64**	28.62	12.22	**40.84**	843.48
Public Water Supply	River	6,485.44	28.39	**6,513.13**	6.89	0.00	**6.89**	6,520.72
	Lake	115,747.40	599.00	**116,346.40**	0.00	110.00	**110.10**	116,456.40
	Estuary	8.72	0.01	**8.73**	0.00	0.00	**0.00**	8.73

- Categories not assessed
- * 29.70 sq mi. not attainable-tidal freshwater

TABLE 3.3 - 4 SIZE OF WATERS IMPAIRED BY VARIOUS CAUSE CATEGORIES

Pollutant	Type	Total Impaired
General Standards (Benthics)	River (mi) Lakes (acres) Estuary (mi^2)	721.33 0 382.50
Unionized Ammonia	River (mi) Lakes (acres) Estuary (mi^2)	1.46 0 1.95
Cause Unknown	River (mi) Lakes (acres) Estuary (mi^2)	1.82 0 0
Priority Organics	River (mi) Lakes (acres) Estuary (mi^2)	10.44 0 0.05
PCB	River (mi) Lakes (acres) Estuary (mi^2)	370.58 78,008.24 82.53
Metals	River (mi) Lakes (acres) Estuary (mi^2)	234.33 0 11.97
PH	River (mi) Lakes (acres) Estuary (mi^2)	895.80 12,906.38 6.61
EPA Overlisting (Nutrients)	River (mi) Lakes (acres) Estuary (mi^2)	45.87 1,500.00 1,538.91
Siltation	River (mi) Lakes (acres) Estuary (mi^2)	8.45 0 0
Organic Enrichment/Low D.O.	River (mi) Lakes (acres) Estuary (mi^2)	991.19 63,040.83 891.58
Temperature	River (mi) Lakes (acres) Estuary (mi^2)	262.38 0 0
Pathogen Indicators	River (mi) Lakes (acres) Estuary (mi^2)	3,111.33 1,061.00 115.64
Non-Priority Organics	River (mi) Lakes (acres) Estuary (mi^2)	90.44 69,268.00 24.77
Fish Tissue	River (mi) Lakes (acres) Estuary (mi^2)	452.74 57,804.24 65.09
Habitat Alterations	River (mi) Lakes (acres) Estuary (mi^2)	16.24 0 0

TABLE 3.3–5 SIZE OF WATERS IMPAIRED BY VARIOUS SOURCE CATEGORIES

Source of Impairment	Type	Total Impaired
Industrial Point Sources	River (mi) Lakes (acres) Estuary (mi^2)	162.52 0 746.00
Municipal Point Sources	River (mi) Lakes (acres) Estuary (mi^2)	94.06 0 747.47
Combined Sewer Overflow	River (mi) Lakes (acres) Estuary (mi^2)	37.55 0 10.84
Collection System Failure & Wastewater Lagoon	River (mi) Lakes (acres) Estuary (mi^2)	23.76 0 0
Agriculture	River (mi) Lakes (acres) Estuary (mi^2)	1,139.38 683.00 0
Silviculture	River (mi) Lakes (acres) Estuary (mi^2)	5.05 0 0
Stratification	River (mi) Lakes (acres) Estuary (mi^2)	0 38,290.83 604.49
Urban Runoff/Storm Sewers	River (mi) Lakes (acres) Estuary (mi^2)	617.80 378.00 13.25
Resource Extraction	River (mi) Lakes (acres) Estuary (mi^2)	81.84 0 0
Land Disposal	River (mi) Lakes (acres) Estuary (mi^2)	92.64 0 0.52
Hydromodification	River (mi) Lakes (acres) Estuary (mi^2)	20.72 29.00 0
Source Unknown	River (mi) Lakes (acres) Estuary (mi^2)	1,952.61 80,973.24 162.69
Habitat Modification	River (mi) Lakes (acres) Estuary (mi^2)	20.66 0 0.75
Natural Sources	River (mi) Lakes (acres) Estuary (mi^2)	1,804.61 34,977.83 58.03
VDH Shellfish Advisory	River (mi) Lakes (acres) Estuary (mi^2)	0 0 78.79
NonPoint Source	River (mi) Lakes (acres) Estuary (mi^2)	91.48 2,435.68 746.00

Source of Impairment	Type	Total Impaired
EPA Over-listing (Point/Nonpoint)	River (mi) Lakes (acres) Estuary (mi^2)	45.87 1,500.00 1,538.91
Commercial Port Authority	River (mi) Lakes (acres) Estuary (mi^2)	0 0 11.97
Contaminated Sediment & Leaking Tanks	River (mi) Lakes (acres) Estuary (mi^2)	48.70 20,300.00 0
Atmospheric Deposition	River (mi) Lakes (acres) Estuary (mi^2)	45.46 0 0
Consent Decree Attachment B	River (mi) Lakes (acres) Estuary (mi^2)	21.08 0 0
Other Point Source/Nonpoint	River (mi) Lakes (acres) Estuary (mi^2)	59.46 2,435.68 736.00
VDH Fish Consumption Advisory	River (mi) Lakes (acres) Estuary (mi^2)	457.41 0 19.74